

REMARKS/ARGUMENTS

No claims have been amended, canceled, or added. Claims 36-58 and 60-78 remain pending in the application. Of these claims, only claims 58 and 36 are independent; claims 37-57 and 60-78 depend from one of claim 58 or claim 36. Applicants respectfully request reexamination and reconsideration of the application.

Initially, Applicants note that this response is being filed within two months of the mailing date of the final Office Action. Therefore, pursuant to MPEP § 706.07(f), Applicants request that, if the examiner takes action with regard to this Response after October 29, 2003, the shortened statutory period for reply be reset as set forth in the PTO's form paragraph 7.67.02. (See MPEP § 706.07(f), pg. 700-77, 1st column, paragraph "(F).")

As another initial matter, the listings of prior art in two Information Disclosure Statements ("IDS") have not been initialed and returned. The first IDS was mailed on January 8, 2002 and listed 54 references. It was received by the PTO on January 28, 2002 and is listed in the PTO's PAIR system as number 11, dated January 28, 2002. The second IDS was submitted electronically on May 5, 2003. Applicants ask the Examiner to consider the art cited in both of these IDS's and initial and return the listings of prior art.

Independent claim 58 was rejected under 35 USC 102 as anticipated by US Patent No. 5,974,662 to Eldridge et al. ("Eldridge"). Applicants respectfully traverse this rejection.

A reference anticipates a claim only if the reference discloses every element of the claim as described in the claim. (MPEP § 2131.) Moreover, "[t]he elements must be arranged as required by the claim" (MPEP § 2131.) Eldridge does not anticipate claim 58 because Eldridge does not disclose the following requirement found in the last phrase of claim 58: "ones of a second plurality of terminals on said unsingulated dice of said semiconductor wafer are pressed against ones of said second plurality of contact elements."

In the Office Action, the interposer of claim 58 is equated with element 504 in Eldridge, and the semiconductor wafer of claim 58 is equated with element 508 in Eldridge. The Office Action does not identify the elements in Eldridge that correspond to the first plurality of contact elements and the second plurality of contact elements of claim 58. Claim 58, however, describes the first plurality of contact elements and the second plurality of contact elements as extending from first and second sides of the interposer. Consequently, Applicants assume that the Examiner equates elements 514 with the first plurality of resilient contact structures in claim 58,

and Applicants assume that the Examiner equates elements 516 with the second plurality of resilient contact structures in claim 58. As shown in Eldridge, the terminals 526 of semiconductor wafer 508 are pressed against probes 524—not interconnect elements 516. Thus, Eldridge does not disclose "ones of a second plurality of terminals on said unsingulated dice of said semiconductor wafer are pressed against ones of said second plurality of contact elements," as required by claim 58. Consequently, Eldridge does not anticipate claim 58, and the rejection of claim 58 must therefore be withdrawn.

Moreover, it would not be obvious to remove Eldridge's space transformer 506 and probes 524 so that interconnect elements 516 contact wafer terminals 526. Not only is there no motivation for such a change, but such a modification would render Eldridge unsatisfactory for its intended use. (See MPEP § 2143.01, pg. 2001-127.) Eldridge teaches that it is essential to planarize the tips of the probes 524. (Eldridge col. 31, lines 4-15.) Removing the space transformer 506 would render useless and inoperative Eldridge's mechanism for planarizing the tips of the probes 524. (See Eldridge col. 25, line 56 through col. 28, line 4; see also col. 30, line 62 through col. 33, line 10.) Therefore, it would not have been obvious to modify Eldridge by removing the space transformer 506.

Thus, independent claim 58 is allowable over the prior art of record. Claims 60-74 and 76 depend from claim 58 and are therefore also allowable.

The only other independent claim pending in the application is claim 36. Independent claim 36 was rejected as obvious in view of Eldridge and US Patent No. 4,820,976 to Brown ("Brown"). Applicants respectfully traverse this rejection on the grounds that it would not have been obvious to replace Eldridge's probe card 502 with Brown's flexible PCB 20 for at least two reasons.

First, replacing Eldridge's probe card 502 with Brown's flexible PCB 20 would render Eldridge unsatisfactory for its intended purpose (see MPEP § 2143.01, pg. 2100-127) and would be contrary to the teachings of Eldridge. As mentioned above, Eldridge teaches that it is essential to planarize the tips of probes 524. (Eldridge col. 31, lines 4-15.) Eldridge's system of screws 536 and 538, pivot spheres 546, spring-loaded mounting ring 540, and mounting plates 530, 532, 534 operate properly to alter the orientation of the tips of probes 524 only if probe card 502 is rigid. (See Eldridge col. 25, line 56 through col. 28, line 4; see also col. 30, line 62 to col. 33, line 10.) Indeed, to ensure the rigidity of the probe card 502, Eldridge places rigid mounting

plates 530, 534 on both sides of the probe card 502. (Eldridge col. 25, lines 33-38 and col. 26, lines 1-8.) Indeed, Eldridge teaches against altering the orientation of the probe card 502. (Eldridge col. 32, lines 12-21.) Therefore, no person of ordinary skill would replace Eldridge's rigid probe card 502 with anything that is flexible—much less, Brown's flexible PCB 20. For this reason alone, claim 36 patentably distinguishes over the prior art of record, and the rejection of claim 36 should be withdrawn.

Second, the motivation given in the Office Action does not support replacing the probe card 502 of Eldridge with Brown's flexible PCB 20. A person of ordinary skill would not be led to replace Eldridge's probe card 502 with Brown's flexible PCB 20 in order to ensure sufficient and balanced electrical contact because:

- (1) Eldridge's resilient probes 524 already ensure sufficient and balanced electrical contact, so there is no need for a flexible PCB, such as Brown's. (See Eldridge col. 24, lines 23-25, and col. 15, lines 43-46. See also Eldridge col. 10, lines 57-67.)
- (2) Replacing Eldridge's probe card 502 with Brown's flexible PCB would not improve the electrical contact between probes 524 and wafer 508 in Eldridge. In Brown, the flexible PCB improves electrical contact only because bumps 24 (which make contact with the wafer 52) are attached to, and therefore flex with, the flexible PCB 20. (Brown col. 4, lines 43-56.) In Eldridge, probes 524 are attached to a rigid, ceramic space transformer 506 (Eldridge col. 24, lines 8-15) and therefore would not flex with probe card 502 even if probe card 502 was flexible. Moreover, in Eldridge, any flexure of the probe card 502 would be absorbed by interposer 504, and therefore would not affect the electrical connections between probes 524 and wafer 508. (See Eldridge col. 25, lines 19-29; col. 27, lines 5-10; col. 28, lines 1-4.)

Likewise, a person of ordinary skill would not be led to replace Eldridge's probe card 502 with Brown's Flexible PCB 20 in order to assure adequate heat transfer from the wafer to the test fixture because:

- (1) The passage relied on in Brown teaches that heat conduction is not sufficient through a polymer consisting of a "special elastomer with conductive particle loading." (Brown col. 1, lines 31-48.) Thus, Brown suggests the need to improve heat conduction only if a polymer is used between the contacts on the die and the contacts on the test fixture. (See Brown col. 1, lines 41-48.) Eldridge does not use any such polymer to contact wafer 508.

Therefore, Brown's teaching of a need to improve heat conduction is not applicable to Eldridge.

(2) Moreover, Eldridge does not even mention heat conduction—much less suggest that the heat conduction of its metal probes 524 is insufficient. Indeed, there is no reason for a person of ordinary skill in the art to think that probes 524 made of metal—which is well known to conduct heat efficiently—would be insufficient heat conductors.

(3) In addition, it is not the use of a flexible PCB 20 per se that accomplishes cooling in Brown; rather, cooling is accomplished by circulating a cold gas on the back side of the substrate 20 on which the bumps 24 that directly contact the wafer 52 are disposed.

(Brown col. 2, lines 17-46, col. 4, lines 57-68.) In Eldridge, the substrate on which the probes 524 are disposed is the space transformer 506. Thus, if Brown suggests taking any measure to improve heat dissipation in Eldridge, it suggests nothing more than circulating a cold gas on the back side of space transformer 506.

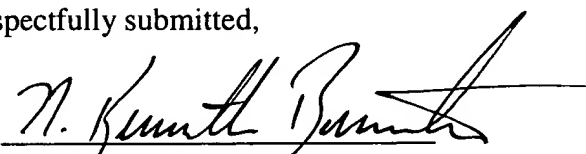
Thus, there is no motivation for replacing Eldridge's probe card 502 with Brown's flexible PCB 20. For this additional reason, the rejection of independent claim 36 should be withdrawn.

For all of the reasons discussed above, independent claim 36 is allowable over the prior art of record. Claims 37-57 and 75 depend from claim 36 and are therefore also allowable.

In view of the foregoing, Applicants submit that all of the claims patentably distinguish over the prior art. Therefore, the rejections of the claims should be withdrawn and the application passed to allowance. If the Examiner believes that a discussion with Applicants' attorney would be helpful, the Examiner is invited to contact the undersigned at (801) 536-6763.

Respectfully submitted,

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